REMARKS

The Office Action mailed May 10, 2004, has been received and reviewed. Claims 1 through 40 and 43 were noted as pending in the Office Action. Claims 1 through 18, 22 through 33 and 35 through 40 have been withdrawn from consideration as being drawn to a non-elected invention. Claims 41, 42 and 44 were previously canceled. Claims 19 through 21, 34 and 43 stand rejected. Applicants have amended claims 19, 34 and 43, and added new claims 45 and 46. Reconsideration of the application as amended herein is respectfully requested.

Priority

The Office Action acknowledges applicants' claim for priority and requires a certified copy of the priority document. Certified copies were provided with the Communication filed September 16, 2004 and thus the priority claim should be perfected. Should any additional information be required by the Office, please contact the undersigned counsel.

Claim Objections

Claims 19 through 21, 34 and 43 were objected to for reciting non-elected subject matter. As requested in the Office Action, each of independent claims 19, 34 and 43 were amended to remove such subject matter. It is requested the objections accordingly be withdrawn.

35 U.S.C. § 112, First Paragraph Rejections

Claims 19 through 21, 34 and 43 were rejected in the Office Action as assertedly failing to comply with the written description requirement under 35 U.S.C. § 112, first paragraph. The Office Action states that theses "claims are directed to a genus of polypeptide molecules with either SEQ ID NO: 6 or 31 or polypeptide having the limitations of 'a fragment of any size' or a polypeptide having the amino acid sequence which is 30%, 50% or 70% identical to SEQ ID NO: 6 or a polypeptide that is 55% identical to SEQ ID NO: 31 (claims 19-21, 34& 43)." It then concludes that these claims are for a "large variable genus of including peptides which can have a wide variety of functions and with the potentiality of generating many different antibodies."

Applicants have amended independent claims 19, 34 and 43 herein. As amended claims 19 and 34 now recite:

19. A purified and isolated polypeptide or fragment thereof, involved in the biosynthetic pathway for ester production in fruit, said purified and isolated polypeptide comprising:
an amino acid sequence selected from the group consisting of: SEQ ID NO: 6 and an amino acid sequence having at least 30% homology with SEQ ID NO: 6,
said polypeptide or fragment thereof having alcohol acyltransferase activity.

34. A purified and isolated polypeptide, or fragment thereof involved in the biosynthetic pathway for ester production in fruit, said purified and isolated polypeptide comprising:
an amino acid sequence selected from the group consisting of: SEQ ID NO: 31 and an amino acid sequence having at least 55% homology with a 326 aa fragment from the C terminal end of the coding sequence of SEQ ID NO: 31,
said polypeptide or fragment thereof having alcohol dehydrogenase activity and being involved in the biosynthetic pathway for ester production in fruit.

These claims do not contain the "fragment of any size" language as each contains a functional element, which specifies the activity of the polypeptide or active fragment, in addition to specific structural (sequence) elements. Applicants thus respectfully submit that these claims are not directed to "a large variable genus" as stated in the Office Action, but are supported by an adequate written disclosure. Additionally, these claims are enabled, as discussed below.

Similarly, independent claim 43 is amended herein to be directed to contain specific structural (sequence) elements, and similarly contains functional elements for the polypeptide or fragment.

Accordingly, applicants submit that amended claims 19, 34 and 43, with dependent claims 20 and 21 are now supported by an adequate written description.

Claims 19 through 21, 34 and 43 were rejected in the Office Action as assertedly lacking enablement under 35 U.S.C. § 112, first paragraph. The Office Action states that the specification "while being enabling for an alcohol transferase of SEQ ID NO: 6 and an alcohol dehydrogenase of SEQ ID NO: 31 (both from strawberry), does not reasonably provide enablement for any alcohol acyl transferase having 30%, 50% or 70% identity to SEQ ID NO: 6; or any alcohol dehydrogenase having 55% identity to SEQ ID NO: 31; or any fragments thereof." (Office Action at page 6). The Office Action goes on to state that "in this case the disclosure is limited to the nucleotide and encoded amino acid sequences of alcohol acyl transferase and

alcohol dehydrogenase of SEQ ID NO: 6 & 31 respectively." (*Ibid.*). Applicants respectfully submit that an examination of the present specification, in view of the art, makes it clear that amended independent claims 19, 34 and 43 are enabled, as are the claims dependent therefrom. It is noted that, as explained previously herein, these amended independent claims are not directed to a "large variable genus" of enzymes as they contain both specific structural and functional limitations.

In the paragraph beginning at page 19, line 30 of the present specification, it is explained that additional sequences for alcohol acyltransferases from fruits other than lemon and strawberry were obtained using primers and form a part of the present specification. These fruits include melon, banana, apple and mango. Accordingly, the present specification enables enzymes other than just those from strawberry. Applicants respectfully submit that as even very closely related alcohol transferases from other fruit species are 30% or even less homologous to the sequences identified in the Office Action, yet are still functional, the identified claims are enabled by the present specification.

Submitted with this response is an Information Disclosure Statement identifying a reference by a research group including the present inventors. This reference Beekwilder, et al., Functional Characterization of Enzymes Forming Volatile Esters from Strawberry and Banana, *Plant Phys.* Vol. 135, 1865-1878 (August 2004), explains that the low sequence identities between similar molecules in different fruits, such as a 21% identity between similar enzymes in melon and strawberry (page 1866, col. 1, first full paragraph) led to further work. The reference then provides a recently assembled phylogenetic tree for such enzymes (FIG. 1, page 1870). From this reference showing subsequent work by those in this technical area, it is clear that the amended claims are enabled by the present specification.

Further, using the LALIGN program, applicants have calculated the % homology between some recently identified alcohol acyltransferases and SEQ ID NO: 6. These calculations were performed on different pieces of the enzymes with differing amounts of overlap. The results are shown in the following table:

Fruit	% homology	% homology
Banana	23.6% (144 aa overlap)	25.7% (35 aa overlap)

Tomato	21.3% (267 aa overlap)	29.1% (55 aa overlap)
Apple	24.9% (261 aa overlap)	36.1% (36 aa overlap)
Melon	22.7% (256 aa overlap)	50.0% (12 aa overlap)
Wild Strawberry	87.6% (453 aa overlap)	

From the fact that even less than 30% homologous proteins still have the same enzymatic function, it can be assumed that protein variants that are more homologous will also have that function. Thus, the amended independent claims are not directed to a "large variable genus" of enzymes, but are enabled by the present specification.

35 U.S.C. § 112, Second Paragraph Rejections

Claims 19 through 21, 34 and 43 were rejected in the Office Action as assertedly indefinite under 35 U.S.C. § 112, second paragraph. Claims 19, 34 and 43 were rejected with respect to the language "involved in the biosynthetic pathways for aliphatic and/or aromatic ester production in fruit." The Office Action state that the claims are indefinite as "it is not clear which of the two enzymes of SEQ ID NO: 6 and 31 are involved in both or one (and/or) aliphatic and aromatic ester production in fruit." (Office Action at page 8). Each of these independent claims has been amended to remove the language "aliphatic and/or aromatic" therefrom. Applicants submit these claims, with dependent claims 20 and 21, are now definite.

Claim 43 was further rejected as assertedly indefinite as "it is unclear how a kit comprising a polypeptide of SEQ ID NO: 6 or 31 is sufficient in diagnosing 'volatile aliphatic and/or aromatic ester compound.'" (Office Action at page 9). As discussed in the preceding paragraph, claim 43 is amended herein to remove the language "aliphatic and/or aromatic." Support for such diagnosis may be found in the paragraph bridging pages 30 to 31 of the specification. Accordingly, it is requested this rejection be withdrawn.

35 U.S.C. § 102

Rejections in view of Accession No. O23943

Claims 19 through 21 and 43 were rejected in the Office Action as assertedly anticipated under 35 U.S.C. § 102(b) by Accession No. O23943. Applicants note the Office Action on page 9, and in the title provided in the Notice of References cited at position "U" identify this Accession No. as Q23943, but that the sequence alignment provided with the Office Action is for Accession No. O23943. At page 9, the Office Action states that the claims recite the phrase "a fragment thereof" and "[t]here is no limitation present in the claims which would restrict the size of the claimed polypeptide fragment." It further states that "[d]i- and tri- peptides are well-known in the art of molecular biology and chemistry and are encompassed by the scope of these claims." The Office Action concludes that as the "fragment in the disclosed reference no. which has fragments larger than di- and tri-peptide(s) and which match Applicants' SEQ ID NO: 6, and therefore anticipates the claims." (Office Action at page 9).

Applicants initially note that the provided accession number appears to consist of a single sequence, not a number of fragments. Additionally, amended claim 19 contains the elements of "said polypeptide or fragment thereof having alcohol acyltransferase activity." This functional limitation requires the fragment to be of sufficient size to perform the activity. A di or tri-peptide, as suggested in the Office Action, would not have such activity. Further, the annotation of the cited accession number was updated in June 2002 (after the instant priority date), prior to which, the activity of the protein from which this partial sequence is taken appears to have been unknown. Accordingly, claim 19 further defines over the cited reference.

Rejection in view of Accession No. T12571

Claim 34 was rejected in the Office Action as assertedly anticipated by Accession No. T12571 under 35 U.S.C. § 102(a). As noted in the Office Action, Section 102(a) requires that that invention be "known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant" and that the date of Accession number T12571 is July 23, 1999. (Office Action at page 9, *see also* sequence alignment V, provided by the Office). As noted on page 4 of the Office Action, the present application claims priority to December 2, 1998. A certified copy of the priority document has been provided to the Office. Accordingly, T12757 should no longer be available as Section 102(a) art and this rejection should be withdrawn.

Rejection in view of Accession No. S28045

Claim 34 was rejected in the Office Action as assertedly anticipated by Accession No. S28045 under 35 U.S.C. § 102(b). The Office Action states that the claim "recites the phrase 'or a fragment thereof' referring to isolated polypeptide of SEQ ID NO: 31," but that "there is no limitation present in the claims that would restrict the size of the claimed polypeptide fragment" (Office Action at page 10). However, amended claim 34 recites "an amino acid sequence selected from the group consisting of: SEQ ID NO: 31 and an amino acid sequence having **at least** 55% homology with a 326 aa fragment from the C terminal end of the coding sequence of SEQ ID NO: 31." (emphasis added). Accordingly, at least a 55% homology would be required. The sequence alignment provided by the Office and identified as W in the Notice of References cited indicates a homology of 54.8% between S28045 and SEQ ID NO. 31. Accordingly, claim 34 defines over the cited reference and should be allowed.

Further, claim 34 additionally requires that the "polypeptide or fragment thereof having alcohol dehydrogenase activity and **being involved in the biosynthetic pathway for ester production in fruit**." (emphasis added). The S28045 sequence is derived from parsley, which is not a fruit. Accordingly, since the claim requires activity in fruit, it further defines over the cited reference.

CONCLUSION

All pending claims are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Office determine that additional issues remain which might be resolved by a telephone conference, the Examiner is respectfully invited to contact applicants' undersigned attorney.

Respectfully submitted,

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